

CLAIMS

1. A set of resonators that are integrated in a single crystal (1) and intended to allow a temperature-stable time base to be produced, characterized in that it comprises at least first (2) and second (3) resonators designed to oscillate in modes of different type and with dimensions such that at least the first thermal coefficient α of their frequency difference is equal or close to zero.

2. The set of resonators as claimed in claim 1, characterized in that said single crystal is a silicon single crystal.

3. The set of resonators as claimed in claim 1 or claim 2, characterized in that said first and second resonators are oriented at an angle such that the second thermal coefficient β of said frequency difference is equal or close to zero.

4. The set of resonators as claimed in one of claims 1 to 3, characterized in that said first resonator (2) is designed to oscillate in an elongation mode.

5. The set of resonators as claimed in one of claims 1 to 4, characterized in that said second resonator (3) is designed to oscillate in a Lamé mode.

6. The set of resonators as claimed in any one of the preceding claims, characterized in that said first and second resonators each have a symmetrical structure formed by a central arm (23, 33) joining two rectangular plates (21, 22 and 31, 32), said resonators being able to be held in the middle part (24, 34) of said central arms.

7. The set of resonators as claimed in any one of the

preceding claims, characterized in that said resonators include piezoelectric excitation means.

8. The set of resonators as claimed in claim 7,
5 characterized in that said piezoelectric excitation means comprise an AlN layer (40) deposited on said central arms and electrodes (43, 45) for contacting, on the one hand, said AlN layer and, on the other hand, the silicon substrate.

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9. The set of resonators as claimed in claim 8, characterized in that the silicon substrate is doped and constitutes one of the electrodes for said piezoelectric excitation means.

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10. A temperature-compensated time base, characterized in that it comprises a set of resonators as claimed in any one of the preceding claims, means (200, 300) for exciting and sustaining their oscillations and means
20 (400, 500) for generating a temperature-stable signal representative of the difference in oscillation frequencies of said resonators.

11. The time base as claimed in claim 10,
25 characterized in that one of the two resonators has a much higher oscillation frequency than the other, and said means for generating a temperature-stable signal further include a frequency divider circuit (400) for reducing the highest frequency before said difference
30 in the oscillation frequencies is taken.